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WORLD EXPERIENCES IN TEACHING ROBOTICS AND METHODOLOGICAL ASPECTS OF ITS PRACTICAL APPLICATION

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Abstract
This article covers the development of robotics in foreign countries and its application in the educational process for children and students.

Keywords: robotics, foreign countries, programming.

Introduction

In 2016, the International Federation of Robotics published a ranking in an article identifying the ten most robotic countries in the world. In this analysis, the so-called density was calculated - the number of robots per 10,000 workers in production industries.

The activities of the International Robotics Federation are as follows:

1) provides information about the world market for studies, surveys, statistical research
2) helps manufacturers and robotics enter new markets
3) The Federation organizes discussions of directors in the round table
4) through the Innovation and Entrepreneurship Award in Robotics and Automation, encourages the development of links between science and industry in robotics research.
5) actively cooperates with national and international robotics organizations
6) The Federation is a sponsor of the International Robotics Symposium The Federation's Conference on Industrial and Service Robotics has been held since 1970. [1]

Countries with the most robots: South Korea (631 robots per 10,000 employees), Singapore (488 robots per 10,000 employees), Germany (309), Japan (303), Sweden (223), Denmark (211), USA (189) , Italy (185), Belgium (184) and Taiwan (177). Spain (160), Netherlands (153), Canada (145), Austria (144), Finland (138), Slovenia (137), Slovakia (135), France (132), Switzerland (128), Czech Republic (101), Australia (83). Overall, factory automation is accelerating globally, with a new average global robot density in manufacturing industries of 74 robots per 10,000 workers (up from 66 in 2015).[2]

Consider the experience of teaching robotics to children in the three most robotic countries in the world: South Korea, Singapore and Germany .

South Korea uses robots to teach children in schools. For example, 29 robots were sent to schools in Daegu to help children learn English . EngKey robots are being used as a telepresence device to transport experienced teachers in the Philippines to a South Korean classroom via a small screen on the robot's head . Filipino teachers can communicate with

children using EngKey's built-in microphones and speakers. Such robots were paid for by the government for schools and cost 1.6 billion won (about 1.39 million US dollars).

Another version of Engkey that doesn't connect students to a teacher uses voice recognition technology to help kids practice English pronunciation and dialogue. These robots were developed by the Korea Institute of Science and Technology (KIST) and are part of a larger program to automate English language learning.

The EngKey robot challenge is a great example of the powerful impact robots can have on education. These devices are more than interactive programs on the physical body, they are portals to the outside world and ambassadors of advanced technology. By developing its robotic English language learning programs, South Korea not only cuts costs, but also encourages its students to gain a deeper understanding and knowledge of advanced technology and foreign languages, thereby helping students' career paths[3] .

Engkey is not the only type of robot used in schools. Preschool teachers in Daejeon received a robotic dog named Genibo and an iRobi robot to help. iRobi records student attendance and uses facial recognition software to ask children about their mood. Originally designed for pets, Genibo has been redesigned to teach dance and gymnastics moves. Similar robots have been introduced to all schools and kindergartens in South Korea .

"Children feel that the robot is their friend," says Bum-Jae You, head of KIST's Center for Cognitive Robotics . [4]

a decade, South Korea has been an innovator in the use of robots for education, but it wasn't until 2017 that the country began offering robotics classes in high schools.

Kim Hyung-Ki, a robotics teacher at Inha University in Seoul's Incheon Suburban High School, walks around the room with a wireless microphone and fills the audience with the kind of character energy you might find at a political rally. He adds to his advice, "Programming is fun!" comes with funny slogans like and "If you know how to code, you can change the world!".

Students program their robots with the Korean version of Scratch, a coding language developed at the MIT Media Lab 10 years ago. To assemble their robots, they use a $128 parts kit made by local company Robotis. The school's director, Lee Dong-sub, said that the university was established to obtain the best teaching practices.

being taught in 20 schools in South Korea , and about 100 teachers will soon be trained for the next school year. South Korean schools started teaching computer science ten years ago . Today, programming classes in the country are mandatory in both universities and lyceums. In South Korea, education is a national obsession.

Singapore, unlike South Korea, although it is in the 2nd place in terms of robotics development, has been teaching children about it for a long time.

is a learning center that develops and implements hands-on technology programs for children between the ages of 4 and 12 . He started in Singapore in 2007 and has since developed hands-on technology curricula for in-school and out-of-school children. The center's team of educators, scientists, engineers and technology experts are passionate about teaching technology concepts to children through hands-on activities .

This center hosts seasonal camps, workshops, school programs and special events to teach robotics to thousands of children each year. The company's mission is in line with the vision of Singapore's Ministry of Education and its motto is very inspiring: "Read less, learn more!"

In Singapore, a lot of attention is being paid to the introduction of artificial intelligence into the educational process . In June 2016, a pilot project was launched by IDA and Nanyang Technological University to see "how robots can be used to teach children interactively" . As part of this pilot project, two humanoid robots named Pepper and NAO were used in two preschools in Singapore.

Pepper was assigned to Jurong Point School where she read stories to the students. It's a four-foot robot equipped with three multi-directional wheels, a 3D camera and a 10-inch touchscreen.

Pepper can be useful for music lessons because it can create different sound effects and rhythmic parts to create music. In addition, it can be effective in teaching mathematics due to its ability to calculate money.

In general, Singapore's teaching system promotes interest in learning and encourages students to be creative and active. Many countries use this technology, which allows you to look at the educational process from the point of view of group and pair forms of children's work.

The essence of this technique is to divide the class into several small groups of 2 or 3 people, where each person studies the educational material independently. After learning, children try on the role of teacher and storyteller: each in turn repeats and evaluates the meaning of the material. At this time, the teacher plays the role of coordinator, corrects, helps and guides children's mental activity.

Singapore's education system has several advantages

1) children simultaneously learn to express their thoughts, listen to another child's thoughts and correct his mistakes, thus reinforcing the material learned in robotics.
2) children's activity increases a lot, especially when the child works as a teacher
3) all students communicate with each other in small groups, so everyone's task is to teach your friend what you know and thus form a positive attitude to the process of learning robotics in children.
4) the process of teaching a child is interesting and unusual, and the quality of knowledge increases significantly with each lesson
5) children develop communication skills, creative thinking, they learn to communicate with each other, criticize a partner and accept criticism in their own direction.
6) With this teaching method, every robotics lesson is like an interesting communicative game and brings only good feelings.

Although Germany is home to dozens of robotics companies, all are overshadowed by industrial robot maker KUKA Robotics Corp. It is ABB Ltd., FANUC Corp. and is one of the big four players in industrial robotics, along with Yaskawa Electric Corp.

KUKA has many years of experience in the field of robotics. In 1973, the company created Famukus, the first industrial robot with six electromechanical axes. In 1996, KUKA took a

giant leap in industrial robot development when it introduced the first PC-based controller. The development marked the dawn of mechatronics, characterized by the precise interaction of software, controllers, and mechanical systems.

For many years, KUKA has played an important role in expanding the application areas of industrial robots beyond the automotive industry. Perhaps the most famous is the bright orange robot.

The company also helps customers automate individual production processes and integrate them into fully automatic systems. The division of KUKA AG serves companies in the aerospace industry, solar technology and the metal processing industry

Germany has a deep base of scientific experts studying almost every aspect of robotic innovation. Currently, more than a dozen major universities and other academic institutions are engaged in various aspects of robotics research.

At the Institute for Robotics and Mechatronics , a branch of the German Aerospace Center, various types of robots are being developed to help humans interact with their environment safely and efficiently. Robots are designed to work in places that are inaccessible or dangerous for humans , as well as to help people in their daily lives and work.

The Institute aims to simulate the entire robot development process, including system analysis, mechanical and electronic systems design, control systems, sensor design, dynamics and software frameworks. The institute also conducts research in perception and perception, planning, machine learning, artificial intelligence and its applications. [4]

It can be concluded that in foreign countries, children are taught robotics in schools from a young age. In Uzbekistan, such training is carried out in groups , sections and other forms, because there is no state program for its regulation and development.

The practice of teaching robotics in Uzbekistan is separate robotics circles and courses, which exist only in regions where there are specialists in this field, the problem is that not everyone can study there.

References:

1. Амперка — Arduino, Raspberry Pi, электронные модули и робототехника. http://amperka.ru
2. Sultanov, R.O., (2021). O’qitishning raqamli texnologiyasi masalalari. Academic research in educational sciences, 2(CSPI conference 3), 804-807.
3. Шапошникова С. Введение в Scratch. Цикл уроков по программированию для детей // Лаборатория юного линуксоида.
4. Бешенков С. А., Лабутин В. Б., Миндзаева Э. В., Рягин С. Н., Шутикова М. И. Технология. Учебник. 5–8 классы. М.: Бином. Лаборатория знаний, 2016.
5. Винницкий Ю. А., Поляков К. Ю. Конструируем роботов на ScratchDuino. Первые шаги. М.: Пилот, 2016.
6. Sultanov, R., Xalmetova, M.(2021). Ikki g`ildirakli transport robotlari harakatini dasturlash. Academic Research in Educational Sciences, 2(2), 108-114.